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4-TRIFLUOROMETHYLBENZAMIDES

Inventors:

Dr. Dietmar Kuhnt
51373 Leverkusen, DE

Dr. Michael Haug
51467 Bergisch Gladbach, DE

Dr. Klaus Jelich
42113 Wuppertal, DE

Dr. Klaus Stenzel

40595 Düsseldorf, DE

Prof. Dr. Heinz-Wilhelm Dehne
53125 Bonn, DE

Dr. Gerd Hänssler
51381 Leverkusen, DE

Dr. Ulrike Wachendorff-Neumann
40789 Monheim, DE

Dr. Christoph Erdelen
42799 Leichlingen, DE

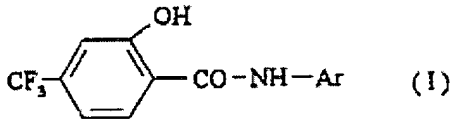
Dr. Martin Kugler
42799 Leichlingen, DE

Dr. Heinrich Schrage
47800 Krefeld, DE

Applicant: Bayer AG
51373 Leverkusen, DE

Abstract

The invention concerns new 4-trifluoromethylbenzamides of the formula (I)



(I)

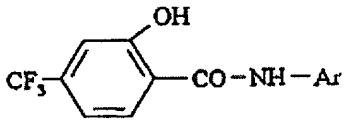
a method for preparing them and their use as pesticides in the protection of plants and materials.

The invention concerns new 4-trifluoromethylbenzamides, a method for preparing them, and their use as pesticides in the protection of plants and materials.

It is known that certain 4-trifluoromethylbenzamides, for example, the compounds 2-hydroxy-4-trifluoromethyl-N-(3-chloro- or 3-bromo- or 3-methyl- or 4-ethyl- or 4-isopropyl- or 3,4-dimethyl- or 3,5-dichloro- or 3-chloro, 4-methylphenyl)benzamide, have fungicidal properties (for example, see WO-A 92/17066).

However, the effectiveness of said compounds is not completely satisfactory in all areas of use, especially at low application rates.

New 4-trifluoromethylbenzamides of the formula (I),



(I)

in which

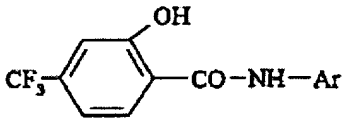
Ar stands for substituted phenyl,

with the exception of:

3-chlorophenyl; 3-bromophenyl; 3-methylphenyl; 3-trifluoromethylphenyl; 4-chlorophenyl; 4-methoxyphenyl; 4-trifluoromethylphenyl; 4-(C_1-C_3)alkylphenyl; 3,5-dichlorophenyl; 3-chloro-4-methylphenyl and 3,4-dimethylphenyl;

were found.

In addition, it was found that the new 4-trifluoromethylbenzamides of formula (I),

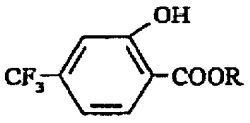


(I)

in which

Ar has the meaning given above,

are obtained if 2-hydroxy-4-trifluoromethylbenzoic acid or its esters of formula (II),



(II)

in which

R stands for hydrogen or alkyl,

are reacted

with anilines of the formula (III),

H_2N - Ar (III)

in which

Ar has the meaning given above,

in the presence of a condensation agent and optionally in the presence of a diluent, as well as a reaction aid.

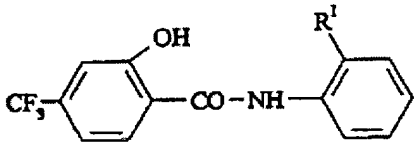
Finally, it was found that the new 4-trifluoromethylbenzamides of formula (I) are very highly suitable as pesticides. They are characterized, in particular, by strong microbicidal properties both in plant protection and in material protection, and by high insecticidal and acaricidal effectiveness.

Surprisingly, the 4-trifluoromethylbenzamides of formula (I) show better effectiveness than that of the structurally similar compounds already known.

The 4-trifluoromethylbenzamides in accordance with the invention are generally defined by formula (I).

The following groups of substances (a) through (g) of formulas (Ia) through (Ig) are preferred:

a)



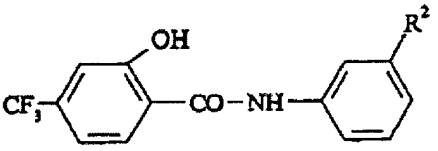
(Ia)

in which

R^1 stands for halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms.

b)



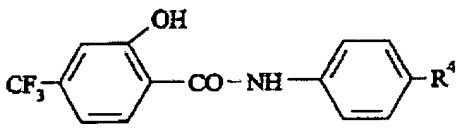
(Ib)

in which

R^2 stands for fluorine, iodine, cyano, nitro; straight-chain or branched alkyl with 2-6 carbon atoms, straight-chain or branched alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl with 2-4 carbon atoms and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms.

c)



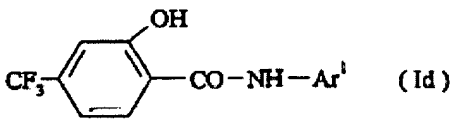
(Ic)

in which

R^4 stands for fluorine, bromine, iodine, cyano, nitro; straight-chain or branched alkyl with 4-6 carbon atoms; straight-chain or branched alkoxy with 2-6 carbon atoms; straight-chain or branched alkylthio with 1-6 carbon atoms; straight-chain or branched haloalkyl with 2-4 carbon atoms and 1-9 like or different halogen atoms, straight-chain or branched haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms.

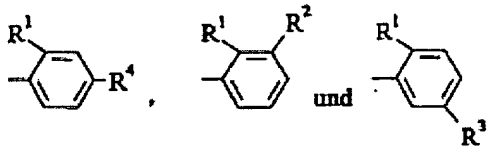
d)



(Id)

in which

Ar^1 stands for the groups



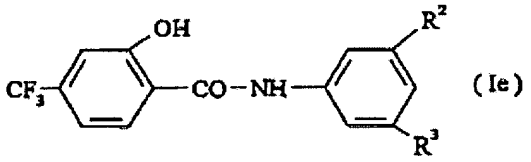
Key: 1 and

where R^1, R^2, R^3 and R^4 are the same or different and stand for halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms;

or R^1 and R^2 together stand for straight-chain or branched alkylenedioxo or haloalkylenedioxo with 1-4 carbon atoms each and 1-8 like or different halogen atoms.

e)



(Ie)

in which

R^2 stands for halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

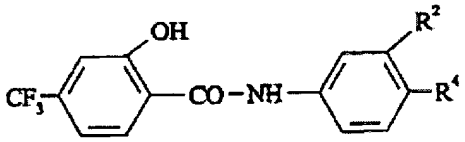
straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4

carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms and

R^3 stands for fluorine, bromine, iodine, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms.

f)



(If)

in which

R^2 stands for halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms, and

R^4 stands for halogen, cyano, nitro; straight-chain or branched alkyl with 2-6 carbon atoms; straight-chain or branched alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4

carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms;

or

R^2 stands for fluorine, bromine, iodine, cyano, nitro; straight-chain or branched alkyl with 2-6 carbon atoms; straight-chain or branched alkoxy or alkylthio with 1-6 carbon atoms; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

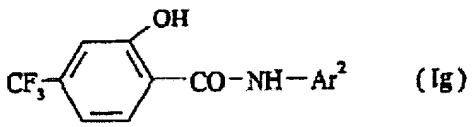
straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms, and

R^4 stands for methyl;

or

R^2 and R^4 together stand for straight-chain or branched alkylenedioxo or haloalkylenedioxo with 1-4 carbon atoms each and 1-8 like or different halogen atoms.

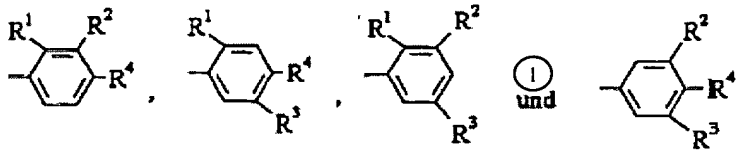
g)



(Ig)

in which

Ar^2 stands for the groups



Key: 1 and

where

R^1, R^2, R^3 and R^4 are the same or different and stand for halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain

or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each and 1-9 like or different halogen atoms;

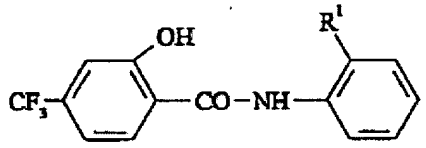
straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms;

or

in each case R^1 and R^2 or R^2 and R^4 or R^3 and R^4 together stand for straight-chain or branched alkylenedioxo or haloalkylenedioxo with 1-4 carbon atoms each and 1-8 like or different halogen atoms.

Especially preferred are the following groups of substances (a) through (g) of formulas (Ia) through (Ig):

a)



(Ia)

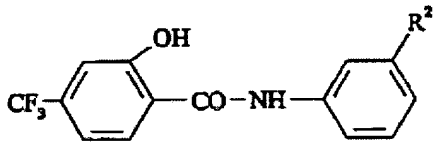
in which

R^1 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl, n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently by fluorine, chlorine, bromine, methyl and/or ethyl.

b)



(Ib)

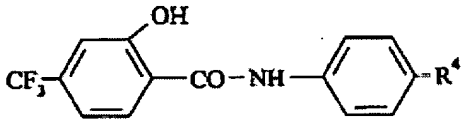
in which

R^2 stands for fluorine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methylisopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl.

c)



(Ic)

in which

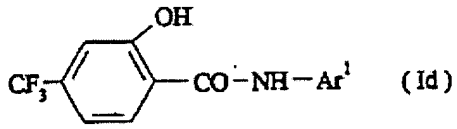
R^4 stands for fluorine, bromine, iodine, cyano, nitro, n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl

isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl.

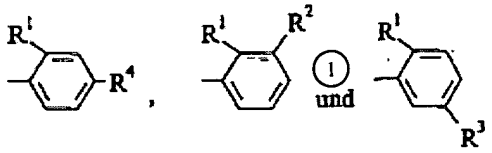
d)



(Id)

in which

Ar^1 stands for the groups



Key: 1 and

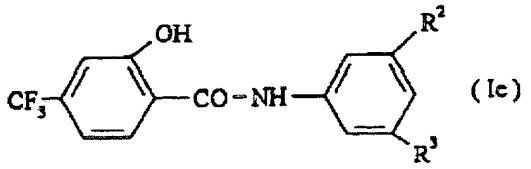
where R^1, R^2, R^3 and R^4 are the same or different and stand for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl;

or R^1 and R^2 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

e)



(Ic)

in which

R^2 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropy; n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

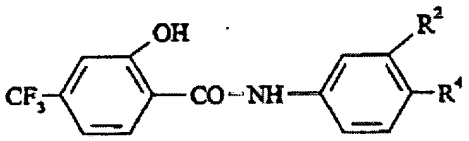
or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl, and

R^3 stands for fluorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl.

f)



(If)

in which

R^2 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropy; n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl, and

R^4 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n- iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl,

or

R^2 stands for fluorine, bromine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

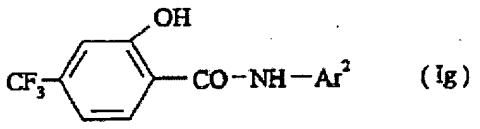
or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl, and

R^4 stands for methyl;

or

R^2 and R^4 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

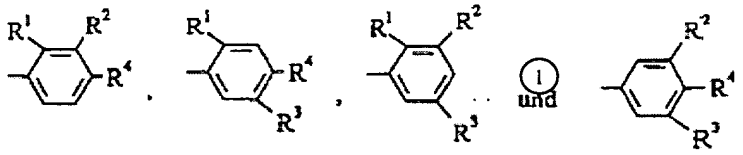
g)



(Ig)

in which

Ar^2 stands for the groups



Key: 1 and

where R^1, R^2, R^3 and R^4 are the same or different and stand for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl, n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl;

amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methyl isopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

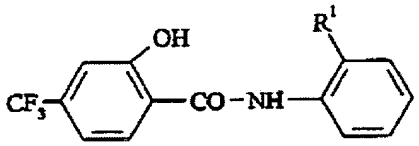
or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl;

or

in each case R^1 and R^2 or R^2 and R^4 or R^3 and R^4 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

Really especially preferred are the following groups of substances (a) through (g) of formulas (Ia) through (Ig):

a)



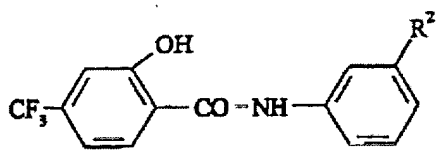
(Ia)

in which

R^1 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethoxylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio.

b)



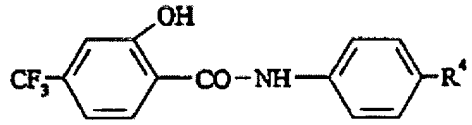
(Ib)

in which

R^2 stands for fluorine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio.

c)



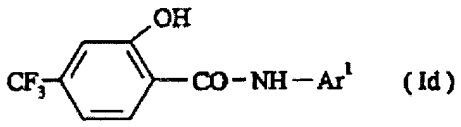
(Ic)

in which

R^4 stands for fluorine, bromine, iodine, cyano, nitro, n-, iso-, sec-, or tert-butyl, n-, iso, sec- or tert-pentyl; ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio.

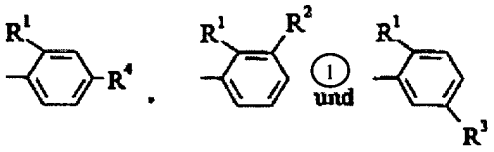
d)



(Id)

in which

Ar^1 stands for the groups



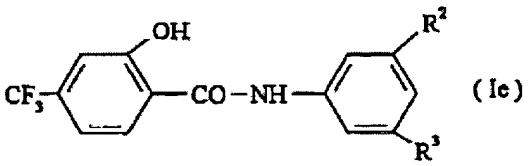
Key: 1 and

where R^1, R^2, R^3 and R^4 are the same or different and stand for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio;

or R^1 and R^2 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

e)



(Ie)

in which

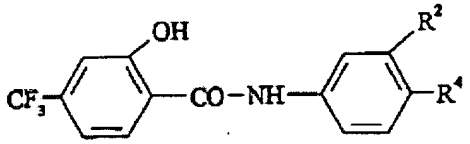
R^2 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio, and

R^3 stands for fluorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio.

f)



(If)

in which

R^2 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethyl, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio, and

R^4 stands for fluorine, chlorine, bromine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl;

or

R^2 stands for fluorine, bromine, iodine, cyano, nitro, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

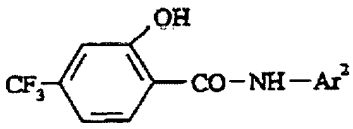
methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio and

R^4 stands for methyl;

or

R^2 and R^4 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

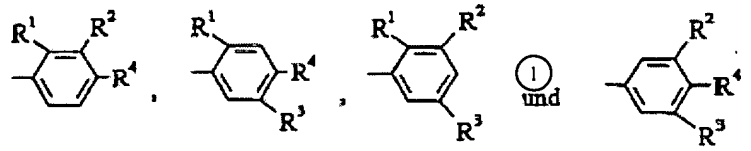
g)



(Ig)

in which

Ar^2 stands for the groups



Key: 1 and

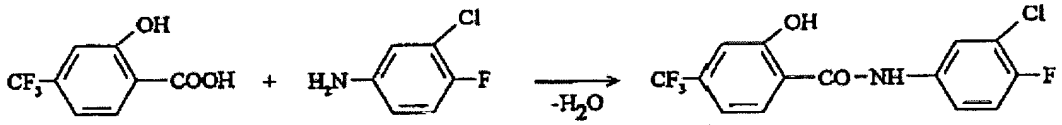
where R^1, R^2, R^3 and R^4 are the same or different and stand for fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl;

methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio;

or

in each case R^1 and R^2 or R^2 and R^4 or R^3 and R^4 together stand for methylenedioxo, ethylenedioxo, difluoromethylenedioxo or tetrafluoroethylenedioxo.

If one uses, for example, 2-hydroxy-4-trifluoromethylbenzoic acid and 3-chloro-4-fluoroaniline as starting substances, the course of the reaction of the method in accordance with the invention can be represented by the following scheme:



The 2-hydroxy-4-trifluoromethylbenzoic acid or its ester that is needed as starting substance to conduct the method in accordance with the invention is generally defined by formula (II). In this formula R preferably stands for hydrogen or for straight-chain or branched alkyl with 1-4 carbon atoms. 2-Hydroxy-4-trifluoromethylbenzoic acid and its esters are known (for example, see WO-A 92/17066).

The anilines that are also necessary as starting substances to conduct the method in accordance with the invention are generally defined by formula (III). In this formula Ar preferably, or especially preferably, has the meanings given above in connection with the

description of the compounds of formula (I) as preferred or especially preferred for the substituents. The anilines of formula (III) are generally known organic chemistry compounds.

The method in accordance with the invention is carried out in the presence of a suitable condensation agent. All of the condensation agents that are usually used for such amidation reactions are possibilities for this. One may mention as examples, acid halide forming agents such as phosphorus tribromide, phosphorus trichloride, phosphorus pentachloride, phosphorus oxychloride or thionyl chloride; anhydride forming agents such as ethyl chloroformate or methanesulfonyl chloride; carbodiimides such as N,N'-dicyclohexylcarbodiimide (DCC) or other conventional condensation agents such as N,N'-carbonyl diimidazole, 2-ethoxy-N-ethoxycarbonyl-1,2-dihydroquinoline (EEDQ) or triphenylphosphine/tetrachlorocarbon.

Inert organic solvents are possibilities as diluents for conducting the method in accordance with the invention. Among these are, in particular, aliphatic, alicyclic or aromatic, optionally halogenated hydrocarbons such as gasoline, benzene, toluene, xylene, chlorobenzene, dichlorobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, chloroform, tetrachlorocarbon; ethers such as diethyl ether, diisopropyl ether, dioxane, tetrahydrofuran or ethylene glycol dimethyl or diethyl ether; ketones such as acetone, butanone or methyl isobutyl ketone; nitriles such as acetonitrile, propionitrile or benzonitrile; amides such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylformanilide, N-methylpyrrolidone or hexamethylphosphoramide; or sulfoxides such as dimethyl sulfoxide.

The method in accordance with the invention is optionally carried out in the presence of a suitable reaction aid. Possibilities as such are all of the conventional inorganic or organic bases. Among these are, for example, alkaline earth or alkali metal hydroxides such as sodium hydroxide, calcium hydroxide, potassium hydroxide or even ammonium hydroxide, alkali metal carbonates such as sodium carbonate, potassium carbonate, potassium hydrogen carbonate, sodium hydrogen carbonate or ammonium carbonate, alkali or alkaline earth metal acetates such as sodium acetate, potassium acetate, calcium acetate or ammonium acetate,, as well as tertiary amines such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, pyridine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononones (DBN) or diazabicycloundecene (DBU).

In conducting the method in accordance with the invention, the reaction temperatures can be varied in a wide range. In general, one operates at temperatures between -60°C and 220°C, preferably at temperatures between 20°C and 180°C.

To conduct the method in accordance with the invention, generally 1.0-2.0 mol, preferably 1.0-1.3 mol of aniline of formula (III), 0.3-5.0 mol, preferably 0.5-2.0 mol, of condensation agent and optionally 0-5.0 mol, preferably 0-2.5 mol, of base used as reaction aid

are used per mol of 2-hydroxy-4-trifluoromethylbenzoic acid or its ester of formula (II). The conduct of the reaction, further processing and isolation of the reaction products take place by known methods.

The active agents of formula (I) in accordance with the invention have a strong effect on pests and can be used in practical terms to combat undesirable pest organisms. The active agents are suitable for use as fungicides in plant protection and in material protection. Moreover, the active agents in accordance with the invention are suitable for control of animal pests.

Fungicides are used in plant protection to control Plasmodiophoromycetes, Oomycetes, Chytridiomycetes, Zygomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes.

Some pathogens of fungal diseases that fall under the headings listed above may be mentioned as examples, but are not meant to be a limiting list:

Pythium species such as *Pythium ultimum*;

Phytophthora species such as *Pseudoperonospora humuli* or *Pseudoperonospora cubensis*;

Plasmopara species such as *Plasmopara viticola*;

Peronospora species such as *Peronospora pisi or P. brassicae*;

Erysiphe species such as *Erysiphe graminis*;

Sphaerotheca species such as *Sphaerotheca fuliginea*;

Podosphaera species such as *Podosphaera leucotricha*;

Venturia species such as *Venturia inaequalis*;

Pyrenophora species such as *Pyrenophora teres* or *P. graminea* (conidiaform: *Drechslera, synonym*: Helminthosporium);

Cochliobolus species such as *Cochliobolus sativus* (conidiaform: *Drechslera*, synonym: Helminthosporium);

Uromyces species such as *Uromyces appendiculatus*;

Puccinia species such as *Puccinia reconditae*;

Tilletia species such as *Tilletia caries*;

Ustilago species such as *Ustilago nuda* or *Ustilago avenae*;

Pellucularia species such as *Pellicularia sasakii*;

Pyricularia species such as *Pyricularia oryzae*;

Fusarium species such as *Fusarium cinerea*;

Botrytis species such as *Botrytis cinerea*;

Septoria species such as *Septoria nodorum*;

Leptosphaeria species such as *Leptosphaeria nodorum*;

Cercospora species such as *Cercospora canescens*;

Alternaria species such as *Alternaria brassicae*

Pseudocercosporella species such as *Pseudocercosporella herpotrichoides.*

Good plant tolerance of the active agents in the concentrations needed for controling plant diseases enables the treatment of above-ground parts of plants, plant and seed goods, and soil.

Here, the active agents in accordance with the invention can be used with particularly good success to control diseases in fruit and vegetable gardening, for example, to control the pathogens of tomato brown rot (*Phytophthora infestans*) or false mildew in grapes (*Plasmopara viticola*) or to control cereal diseases such as wheat blotch (*Septoria nodorum*) or spot blotch in barley or wheat (*Cochliobolus sativus*) or net blotch in barley (*Pyrenophora teres*) or to control rice diseases such as rice blast (*Pyricularia oryzae*) or rice sheath blight (*Pellicularia sasakii*).

In addition, the active agents in accordance with the invention show good in vitro activity.

Moreover, the active agents in accordance with the invention are suitable for control of animal pests, preferably arthropods and nematodes, especially insects and spiders, that occur in agriculture, forests, supply and material protection, as well as in the hygiene sector. They are effective against normally sensitive and resistant species and against all or individual stages of development. Among the pests noted above are:

From the Isopoda order, for example, *Oniscus asellus, Armadillidium vulgare, Porcellio scaber.*

From the Diplopoda order, for example, *Blaniulus guttulatus.*

From the Chilopoda order, for example, *Geophilus carpophagus, Scutigera* spp.

From the Symphyla order, for example, *Scutigerella immaculatae.*

From the Thysanura order, for example, *Lepisma saccharina.*

From the Collembola order, for example, *Onychiums armatus.*

From the Orthoptera order, for example, *Blatta orientalis, Periplaneta americana, Leucophaea maderae, Blattella germanica, Acheta domesticus, Gryllotalpa* spp., *Locusta migratoria migratorioides, Melanoplus differentialis, Schistocerca gregaria.*

From the Dermaptera order, for example, *Forficula auricularia.*

From the Isoptera order, for example, *Reticulitermes* spp.

From the Anoplura order, for example, *Phylloxera vastatrix, Pemphigus spp., Pediculus humanus corporis, Haematopinus spp., Linognathus* spp.

From the Mallophaga order, for example, *Trichodectes spp., Damalinea* spp.

From the Thysanoptera order, for example, *Hercinothrips femoralis, Thrips tabaci.*

From the Heteroptera order, for example, *Eurygaster* spp., *Dysdercus intermedius, Piesma quadrata, Cimex lectularius, Rhodnius prolixus, Triatoma* spp.

From the Homoptera order, for example, *Aleurodes brassicae, Bemisia tabaci, Trialeurodes vaporariorum, Aphis gossypii, Brevicoryne brassicae, Cryptomyzus ribis, Aphis fabae, Doralis pomi, Eriosoma lanigemm, Hyalopterus arundinis, Macrosiphum avenae, Myzus* spp., *Phorodon humuli, Rhopalosiphum padi, Empoasca* spp., *Euscelis bilobatus, Nephotettix cincticeps, Lecanium corni, Saissetia oleae, Laodelphax striatellus, Nilaparvata lugens, Aonidiella aurantii, Aspidiotus hederae, Pseudococcus* spp., *Psylla* spp.

From the Lepidoptera order, for example, *Pectinophora gossypiella, Bupalus piniarius, Cheimatobia brumata, Lithocolletis blancardella, Hyponomeuta padella, Plutella maculipennis, Malacosoma neustria, Euproctis chrysorrhoea, Lymantria* spp., *Bucculatrix thurberiella, Phyllocnistis citrella, Agrotis* spp., *Euxoa* spp., *Feltia* spp., *Earias insulana, Heliothis* spp., *Spodoptera exigua, Mamestra brassicae, Panolis flammea, Prodenia litura, Spodoptera* spp., *Trichoplusia ni, Carpocapsa pomonella, Pieris* spp., *Chilo* spp., *Pyrausta nubilalis, Ephestia kuehniella, Galleria mellonella, Tineola bisselliella, Tinea pellionella, Hofmannophila pseudospretella, Cacoecia podana, Capua reticulana, Choristoneura fumiferana, Clysia ambiguella, Homona magnanima, Tortrix viridana.*

From the Coleoptera order, for example, *Anobium punctatum, Rhizopertha dominica, Acanthoscelides obtectus, Bruchidius obtectus, Hylotrupes bajulus, Agelastica alni, Leptinotarsa decemlineata, Phaedon cochleariae, Diabrotica* spp., *Psylliodes chrysocephala, Epilachna varivestis, Atomaria* spp., *Oryzaephilus surinamensis, Anthonomus* spp., *Sitophilus* spp., *Otiorrhynchus sulcatus, Cosmopolites sordidus, Ceuthorrhynchus assimilis, Hypera postica, Dermestes* spp., *Trogoderma* spp., *Anthrenus* spp., *Attagenus* spp., *Lyctus* spp., *Meligethes aeneus, Ptinus* spp., *Niptus hololeucus, Gibbium psylloides, Tribolium* spp., *Tenebrio molitor, Agriotes* spp., Conoderus spp., *Melolontha melolontha, Amphimallon solstitialis, Costelytra zealandica.*

From the Hymenoptera order, for example, *Diprion* spp., *Hoplocampa* spp., *Lasius* spp., *Monomorium pharaonis, Vespa* spp.

From the order Diptera, for example, *Aedes* spp., *Anopheles* spp., *Culex* spp., *Drosophila melanogaster, Musca* spp., *Famia* spp., *Calliphora erythrocephala, Lucilia* spp., *Chrysomyia* spp., *Cuterebra* spp., *Gastrophilus* spp., *Hyppobosca* spp., *Stomoxys* spp., *Oestrus* spp., *Hypoderma* spp., *Tabanus* spp., *Tannia* spp., *Bibio hortulanus, Oscinella frit, Phorbia* spp., *Pegomyia hyoscyami, Ceratitis capitata, Dacus oleae, Tipula paludosa.*

From the Siphonaptera order, for example, *Xenopsylla cheopis, Ceratophyllus* spp.

From the Arachnida order, for example, *Scorpio maurus, Latrodectus mactans.*

From the *Acarina* order, for example, *Acarus siro, Argas* spp., *Ornithodoros* spp., *Dermanyssus gallinae, Eriophyes ribis, Phyllocoptruta oleivora, Boophilus* spp., *Rhipicephalus*

spp., *Amblyomma* spp., *Hyalomma* spp., *Ixodes* spp., *Psoroptes* spp., *Chorioptes* spp., *Sarcoptes* spp., *Tarsonemus* spp., *Bryobia praetiosa*, *Panonychus* spp., *Tetranychus* spp.

Among nematodes that are plant parasites are *Pratylenchus* spp., *Radopholus simileis, Ditylenchus dipsaci, Tylenchulus semipenetrans, Heterodera* spp., *Meloidogyne* spp., *Aphelenchoides* spp., *Longidorus* spp., *Xiphinema* spp., *Trichodorus* spp.

The active agents of formula (I) in accordance with the invention are also characterized by excellent acaricidal activity, for example, against the general spider mites (*Tetranychus urticae*), and by excellent insecticidal or leaf insecticidal activity, for example, against the larvae of the diamondback moth (*Plutella xylostella*) or against the caterpillars of the diamondback moth (*Plutella maculipennis*) or mustard beetle larvae (*Phaedon cochleariae*).

Moreover, the active agents in accordance with the invention can be used to protect industrial materials against attack and decomposition by undesirable microorganisms.

Industrial materials are, in this context, understood to mean nonliving materials that have been prepared for use in industry. For example, industrial materials to be protected against microbial change or decomposition by agents in accordance with the invention can be glues, sizing, papers and cardboard, textiles, leather, wood, paints and plastic articles, coolant lubricants and other materials that can be attacked or decomposed by microorganisms. Also included among materials needing protection are parts of production plants, for example, cooling water circuits, which can be adversely affected through the propagation of microorganisms. Within the scope of this invention one may mention as industrial materials glues, sizing, papers and cardboards, leather, wood, paints, coolant lubricants and heat transfer liquids, and, especially preferable, wood.

The substances in accordance with the invention are preferably suitable for protecting paints against attack and decomposition by microorganisms.

One may mention as microorganisms that can cause a decomposition or change of industrial materials, for example, bacteria, fungi, yeasts, algae and slime organisms. The active agents in accordance with the invention preferably act against fungi, especially slime fungi, wood-discoloring and wood-destroying fungi (*Basidiomycetes*) and against slime organisms and algae.

For example, microorganisms of the following genera may be mentioned:

Alternaria, such as *Alternaria tenuis*,

Aspergillus, such as *Aspergillus niger*;

Chaetomium, such as *Chaetominum globosum*;

Coniophora, such as *Coniophora puteana*;

Lentinus, such as *Lentinus tigrinus*;

Penicillium, such as *Penicillium glaucum*;

Polyporus, such as *Polyporus versicolor*;
Aureobasidium, such as *Aureobasidium pullulans*;
Sclerophoma, such as *Sclerophoma pityophila*;
Trichoderma, such as *Trichoderma viride*;
Escherichia, such as *Escherichia coli*;
Pseudomonas, such as *Pseudomonas aeruginosa*;
Staphylococcus, such as *Staphylococcus aureus.*

Depending on their physical and/or chemical properties, the active agents can be converted to conventional formulations such as solutions, emulsions, suspensions, powders, foams, pastes, granulates, aerosols, very fine encapsulations in polymer substances, and coating compounds for seed materials,, as well as ULV cold and warm mist formulations, in each case according to area of use.

These formulations are prepared in known ways, for example, by mixing the active agents with extenders, thus liquid solvents, liquefied gases under pressure and/or solid carriers, optionally using surface-active agents, thus emulsifiers and/or dispersing agents and/or foam-producing agents. If water is used as extender it is also possible, for example, to use organic solvents such as alcohols as auxiliary solvents. Possibilities as liquid solvents are essentially: aromatics such as xylene, toluene, alkylnaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes such as 1,2-dichloroethane or methylene chloride, aliphatic hydrocarbons such as cyclohexane or paraffins, for example, gasoline or other petroleum fractions, alcohols such as ethanol, isopropanol, butanol, benzyl alcohol or glycol,, as well as their ethers and esters, ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, highly polar solvents such as dimethylformamide or dimethyl sulfoxide,, as well as water; liquefied gaseous extenders or carriers are liquids that are gaseous at normal temperature and normal pressure, for example, aerosol propellant gases such as halocarbons, as well as butane, propane, nitrogen and carbon dioxide; possibilities as solid carriers are: for example, natural ground stones such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and synthetic ground stone such as finely divided silicic acid, aluminum oxide and silicates; possibilities as solid carriers for granulates are: for example, broken and fractionated natural rocks such as calcite, marble, pumice, sepiolite, dolomite, and synthetic granulates of inorganic and organic ground materials, as well as granulates of organic materials such as sawdust, coconut shells, corn and tobacco stalks; possibilities as emulsifying and/or foam-producing agents are, for example, nonionic and anionic emulsifiers such as polyoxyethylene fatty acid esters polyoxyethylene fatty alcohol ethers, for example, alkylaryl polyglycol ether, alkyl sulfonates, alkyl sulfates, aryl

sulfonates, as well as protein hydrolyzates; possibilities as dispersing agents are, for example, lignin sulfite wastes and methylcellulose.

Adhesion agents such as carboxymethylcellulose, natural and synthetic, powdered, granular or latex polymers such as gum arabic, polyvinyl alcohol, polyvinyl acetate, as well as natural phospholipids such as cephalins and lecithins and synthetic phospholipids can be used in the formulations as adhesives. Other additives include mineral and vegetable oils.

Dyes such as inorganic pigments, for example, iron oxide, titanium oxide, ferrocyan blue and organic dyes such as alizarin, azo and metal phthalocyanine dyes and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc can also be used.

The formulations for use in plant protection generally contain between 0.1 and 95% by weight active agent, preferably between 0.5 and 90%.

The active agents in accordance with the invention when used as fungicides can be used as such or can be used in formulations in mixtures with known fungicides, bactericides, acaracides, nematicides or insecticides, in order to broaden the spectrum of action or to prevent against development of resistance. In many cases synergistic effects are obtained, i.e., the effectiveness of the mixture is greater than the effectiveness of the individual components.

The following compounds, for example, are particularly good agents for mixing with the active agents in accordance with the invention:

Fungicides

2-Aminobutane; 2-anilino-4-methyl-6-cyclopropylpyrimidine; 2',6'-dibromo-2-methyl-4'-trifluoromethoxy-4'-trifluoromethyl-1,3-thiazole-5-carboxanilide; 2,6-dichloro-N-(4-trifluoromethylbenzyl)benzamide; (E)-2-methylimino-N-methyl-2-(2-phenoxyphenyl)acetamide; 8-hydroxyquinoline sulfate; methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidine-4-yloxy]phenyl}-3-methoxyacrylate; methyl-(E)-methoximino[alpha-(o-tolyloxy)-o-tolyl]acetate; 2-phenylphenol (OPP), aldimorph, ampropylfos, anilazin, azaconazole,

benalaxyl, benodanil, benomyl, binaparyl, biphenyl, bitertanol, blasticidin-S, bromuconazole, bupirimate, buthiobate,

calcium polysulfide, captafol, captan, carbendazim, carboxine, quinomethionate (quinomethionate), chloroneb, chloropicrin, chlorothalonil, chlozolinate, cufraneb, cymoxanil, cyproconazole, cyprofuram,

dichlorophen, diclobutrazol, diclofluanide, diclomezine, dichlorane, diethofencarb, difenoconazole, dimethirimol, dimethomorph, diniconazole, dinocap, diphenylamine, dipyrithione, ditalimfos, dithianone, dodine, drazoxolone,

edifenphos, epoxyconazole, ethirimol, etridiazole,

fenarimol, fenbuconazole, fenfuram, fenitropane, fenpiclonile, fenpropidine, fenpropimorph, fentinacetate, fentin hydroxide, ferbam, ferimzone, fluazinam, fludioxonil, fluoromide, fluquinconazole, flusilazole, flusulfamide, flutolanil, flutriafol, folpet, fosetyl aluminum, fthalide, fuberidazole, furalaxyl, furmecyclox, guazatine,

hexachlorobenzene, hexaconazole, hymexazole,

imazalil, imibenconazole, iminoctadien, iprobenfos (IBP), iprodione, isoprothiolan, kasugamycin, copper preparations such as: copper hydroxide, copper naphthenate, copper oxychloride, copper sulfate, copper feroxide, oxine copper and Bordeaux mixture, mancopper, mancozeb, maneb, mepanipyrim, mepronil, metalaxyl, metconazole, methasulfocarb, methfuroxam, metiram, metsulfovax, myciobutanil,

nickel dimethyl dithiocarbamate, nitrothal isopropyl, nuarimol,

ofurace, oxadixyl, oxamocarb, oxycarboxine,

pefurazoate, penconazoi, pencycuron, phosdiphen, pimaricin, piperalin, polyoxine, probenzaole, prochloraz, procymidone, propamocarb, propiconazole, propineb, pyrazophos, pyrifenox, pyrimethanil, pyroquilon,

quintozen (PCNB),

sulfur and sulfur preparations,

tebuconazole, tecloftalam, tecnazen, tetraconazole, thiabendazole, thicyofen, thiophanate methyl, thiram, tolclophos methyl, tolylfluanide, triadimefon, triadimenol, triazoxide, trichlamide, tricyclazole, tridemorph, triflumizole, triforin, triticonazole,

validamycin A, vinclozoline,

zineb, ziram

Bactericides

Bronopol, dichlorophen, nitrapyrine, nickel dimethyl dithiocarbamate, casugamycin, octhilinone, furancarboxylic acid, oxytetracycline, probenazole, streptomycin, tecloftalam, copper sulfate and other copper preparations.

Insecticides/Acaricides/Nematicides

Abamectin, abamectin, AC 303 630, acephate, acrinathrin, alanycarb, aldicarb, alphamethrin, amitraz, avermectin, AZ 60541, azadirachtin, azinphos A, azinphos M, azocyclotin,

Bacillus thuringiensis, bendiocarb, benfuracarb, bensultap, betacyluthrin, bifenthrin, BPMC, brofenprox, bromophos A, bufencarb, buprofezin, butocarboxine, butylpyridaben,

cadusafos, carbaryl, carbofuran, carbophenothione, carbosulfate, cartap, CGA 157 419, CGA 184699, chloethocarb, chlorethoxyfos, chlorfenvinphos, chlorfluazuron, chlormephos,

chlorpyrifos, chlorpyrifos M, cis-resmehtrin, clocythrin, clofentezin, cyanophos, cycloprothrin, cyfluthrin, cyhalothrin, cyhexatin, cypermethrin, cyromazine, deltamethrin, demeton M, demeton S, demeton S-methyl, diafenthiuron, diazinone, dichlofenthione, dichlorvos, dicliphos, dicrotophos, diethione, diflubenzurone, dimethoate, dimethylvinphos, dioxanthione, disulfotone,

edifenphos, emamectin, esfenvalerate, ethiofencarb, ethione, ethofenprox, ethoprophos, etrimphos,

fenamiphos, fenazaquin, fenbutatin oxide, fenitrothione, fenobucarb, fenothiocarb, fenoxycarb, fenpropathrin, fenpyrad, fenpyroximate, fenthione, fenvalerate, fipronil, fluazinam, flucycloxurone, flucythrinate, flufenoxuron, flufenprox, fluvalate, fonophos, formothione, fosthiazate, fubfenprox, furathiocarb,

HCH, heptenophos, hexaflumuron, hexythiazox,

imidacloprid, iprobenfos, isazophos, isofenphos, isoprocarb, isoxathione, ivemectin, lambda cyhalothrin, lufenuron,

malathione, mecarbam, mervinphos, mesulfenphos, metaldehyde, methacrifos, methamidophos, methidathione, methiocarb, methomyl, metolcarb, milbemectin, monocrotophos, moxidectin,

naled, NC 184, M 25, nitenpyram

omethoate, oxamyl, oxydemethon M, oxydeprofos,

parathion A, parathion M, permetrhin, phenthoate, phorate, phosalone, phosmet, phosphamdon, phoxim, pirimicarb, pirimiphos M, primiphos A, profenofos, promecarb, propaphos, propoxur, prothiofus, prothoate, pymetrozine, pyrachlophos, pyradaphenthione, pyresmethrin, pyrethrum, pyridaben, pyrimidifen, pyriproxifen,

quinalphos,

RH 5992

salithione, sebufos, silafluofen, sulfotex, sulprofos,

tebufenozide, tebufenpyrad, tebupinmphos, teflubenzuron, tefluthrin, temephos, terbam, terbufos, tetrachlorvinphos, thiafenox, thiodicarb, thiofanox, thiomethone, thionazine, thunngiensin, tralomethrin, triarathen, triazophos, triazuron, trichlorfon, triflumuron, trimethacarb,

vamtdothione, XMC, xylylcarb, YI 5301/5302, zetamethrin.

Mixing them with other known active agents such as herbicides or with fertilizers and growth regulators is also possible.

When used as fungicides the active agents can be used as such, in the form of their formulations or in the form of application forms prepared from these formulations, for example, ready-to-use solutions, suspensions, spray powders, pastes, soluble powders, dusting agents and

granulates. The use takes place in the conventional way, for example, by pouring, splashing, spraying, scattering, dusting, foaming, spreading, etc.

It is also possible to apply the active agents by the ultra-low volume method or to inject the active agent or the active agent preparation into the soil. The seed material of plants can also be treated.

When plant parts are treated, the active agent concentration in the usage forms can vary widely when used as fungicides. In general they are between 1 and 0.0001 wt%, preferably between 0.5 and 0.001%.

When used as fungicides in seed material treatment active agent amounts of 0.001-50 g per kilogram of seed material, preferably 0.05-10 g, are generally needed.

When used as fungicides in soil treatment, the active agent concentrations from 0.00001 to 0.1 wt%, preferably from 0.0001 to 0.02% are needed at the point of use.

When used as insecticides and acaricides, the active agents in accordance with the invention can be in their commercial formulations, as well as in usage formulations prepared from these formulations, in a mixture with other active agents such as insecticides, attractants, sterilants, acaricides, nematicides, fungicides, growth regulators or herbicides. Among the insecticides are, for example, phosphorus acid esters, carbamates, carboxylic acid esters, chlorinated hydrocarbons, phenyl ureas, substances produced by microorganisms, etc.

The following compounds may be mentioned:

acrinathrin, alphamethrin, betacyfluthrin, bifenthrin, brofenprox, cis-resmethrin, clocythrin, cycloprothrin, cyfluthrin, cyhalothrin, cypermethrin, deitamethrin, esfenvalerate, etofenprox, fenpropathrin, fenvalerate, flucythrinate, fluvalinate, lambda-cyhalothrin, permethrin, pyresmethrin, pyrethrum, silafluofen, tralomethrin, zetamethrin,

alanycarb, bendiocarb, benfuracarb, bufencarb, butocarboxim, carbaryl, cartap, ethiofencarb, fenobucarb, fenoxycarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, promecarb, propoxur, terbam, thiodicarb, thiofanox, trimethacarb, XMC, xylylcarb,

acephate, azinphos A, azinphos M, bromophos A, cadusafos, carbophenothione, chlorfenvinphos, chlormephos, chlorpyrifos, chlorpyrifos M, cyanophos, demeton M, demeton S-methyl, demeton S, diazinone, dichlorvos, dicliphos, dichlorfenthione, dicrotophos, dimethoate, dimethylvinphos, dioxathione, disulfotone, edifenphos, ethion, etrimphos, fenitrothione, fenthione, fonophos, formothione, heptenophos, ibrobenfos, isazophos, isoxathione, phorate, malathione, mecarbam, mervinphos, mesulfenphos, methacrifos, methamidophos, naled, omethoate, oxydemeton M, oxydeprofos, parathione A, parathione M, phenothoate, phorate, phosalone, phosmet, phosphamdon, phoxim, pirimiphos A, pirimiphos M, propaphos, prothiophos, prothoate, pyraclophos, pyridaphenthione, quinalphos, salithione,

sebufos, sulfotep, sulprofos, tetrachlorvinphos, temephos, thiomethone, thionazine, trichlorfon, triazophos, vamidothione,

buprofezin, chlorfiuazuron, diflubenzuron, flucycloxuron, flufenoxuron, hexaflumuron, pyriproxifen, tebufenozide, teflubenzuron, triflumuron,

imidacloprid, netenpyram,
N-[(6-chloro-3-pyridinyl)methyl]-N'-cyano-N-methylethaneimidazide (NI-25),

abamectin, amitrazin, avermectin, azadirachtin, bensuftap, Bacillus thurmgiensis, cyromazine, diafenthiuron, emamectin, ethofenprox, fenpyrad, fipronil, flufenprox, lufenuron, metaldehyde, milbemectin, pymetrozine, tebufenpyrad, triazuron,

aldicarb, bendiocarb, benfuracarb, carbofuran, carbosulfane, chlorethoxyfos, cloethocarb, disulfotone, ethophrophos, etrimphos, fenamiphos, fipronil, fonofos, fosthiazate, furathiocarb, HCH, isazophos, isofenphos, methiocarb, monocrotophos, nitenpyram, oxamyl, phorate, phoxim, prothiofos, pyrachlofos, sebufos, silafluofen, tebupirimphos, tefluthrin, terbufos, thiodicarb, thiafenox,

azocyclotin, butylpyridaben, clofentezine, cyhexatin, diafenthiuron, diethione, emamectin, fenazaquin, fenbutatin oxide, fenothiocarb, fenpropathrin, fenpyrad, fenpyroximate, fluazinam, fluazuron, flucycloxuron, flufenoxuron, fluvalinate, fubfenprox, hexythiazox, ivemectin, methidathione, monocrotophos, moxidectin, naled, phosalone, profenofos, pyraclofos, pyridaben, pyrimidifen, tebufenpyrad, thuringiensin, triarathene and
4-bromo-2-(4-chlorophenyl)-1-(ethoxymethyl)-5-(trifluoromethyl)-1H-pyrrole-3-carbonitrile (AC 303630).

When used as insecticides and acaricides, the active agent in accordance with the invention can also be in the form of their commercial formulations and in the form for use prepared from these formulations in mixtures with synergists. Synergists are compounds through which the effect of the active agents is increased without the added synergist itself having to be active.

The active agent content of the usage forms prepared from the commercial formulations can vary widely when the agents are used as insecticides and acaricides. The active agent concentration of the usage forms can be from 0.0000001 up to 95 wt% active agent, preferably between 0.0001 and 1 wt%.

The agents used for protection of industrial materials contain the active agents in general in an amount from 1 to 95%, preferably from 10 to 75%.

The usage concentrations of the active agents in accordance with the invention are governed by the type and occurrence of the microorganisms that are to be controlled and by the composition of the material that is to be protected. The optimum usage amount can be

determined experimentally. Generally, the usage concentrations range from 0.001 to wt%, preferably from 0.05 to 1.0 wt%, with respect to the material that is to be protected.

The effectiveness and spectrum of activity of the active agents used in accordance with the invention or the agents and concentrates prepared from them or the formulations in general can be increased if other antimicrobially active compounds, fungicides, bactericides, herbicides, insecticidal or other active agents are optionally added to increase the spectrum of activity or to achieve particular effects, such as additional protection against insects. These mixtures can have a broader spectrum of activity than that of the compounds in accordance with the invention.

In many cases synergistic effects are obtained, i.e., the effectiveness of the mixture is greater than the effectiveness of the individual components. Especially good substances for mixing are, for example, the following compounds:

sulfenamides such as dichlorofluanide (euparen), tolyfluanide (methyleuparen), folpet, fluorfolpet;

benzimidazoles such as carbendazime (MBC), benomyl, fuberidazole, thiabendazole or their salts;

thiocyanates such as thiocyanatomethylthiobenzothiazole (TCMTB), methylene bisthiocyanate (MBT);

quaternary ammonium compounds such as benzyldimethyltetradecylammonium chloride, benzyldimethyldodecylammonium chloride, dodecyldimethylammonium chloride;

morpholine derivatives such as C_{11}-C_{14}-4-alkyl-2,6-dimethylmorpholine homologs (tridemorph), (±)-cis-4-[tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine (fenpropimorph), falimorp;

phenols such as o-phenylphenol, tribromophenol, tetrachlorophenol, pentachlorophenol, 3-methyl-4-chlorophenol, dichlorophen, chlorophen, or their salts;

azoles such as triadimethon, triadimenol, bitertanol, tebuconazole, propiconazole, azaconazole, hexaconazole, prochloraz, cyproconazole, 1-(2-chlorophenyl)-2-(1-chlorocyclopropyl)-3-(1,2,4-triazol-1-yl)propane-2-ol or 1-(2-chlorophenyl)-2-(1,2,4-triazol-1-yl-methyl)-3,3-dimethylbutane-2-ol.

Iodopropargyl derivatives such as iodopropargylbutyl carbamate (IPBC), -chlorophenylformal,-phenylcarbamate,-hexylcarbamate,-cyclohexyl carbamate, iodopropargyloxyethylphenyl carbamate;

iodine derivatives such as diiodomethyl-p-arylsulfones, for example, diiodomethyl-p-tolylsulfone;

bromine derivatives such as bromopol;

isothiazolines such as N-methylisothiazolin-3-one, 5-chloro-N-methylisothiazolin-3-one, 4,5-dichloro-N-octylisothiazolin-3-one, N-octylisothiazolin-3-one (octilinone);

benzisothiazolinones, cyclopenteneisothiazolines;

pyridines such as 1-hydroxy-2-pyridinethione (and its Na, Fe, Mn, Zn salts), tetrachloro-4-methylsulfonylpyridine;

metal soaps such as tin, copper, and zinc naphthenate, -octoate, -2-ethylhexanoate, -oleate, -phosphate,and -benzoate, oxides such as TBTO, Cu_2O, CuO, ZnO;

organic tin compounds such as tributyltin naphthenate and tributyltin oxide;

dialkyldithiocarbamates such as Na and Zn salts of dialkyldithiocarbamates, tetramethylthiuramididisulfide (TMTD);

nitriles such as 2,4,5,6-tetrachloroisophthalonitrile (chlorothalonile) and other microbicides with activated halogen groups such as Cl-Ac, MCA, tectamer, bromopol, bromidox;

benzthiazoles such as 2-mercaptobenzothiazoles; see dazomet;

quinolines such as 8-hydroxyquinoline;

formaldehyde-producing compounds such as benzyl alcohol mono(poly)hemiformal, oxazolidine, hexahydro-s-triazine, N-methylolchloracetamide;

tris-N-(cyclohexyldiazeniumdioxy)aluminum, N-(cyclohexyldiazeniumdioxy)tributyltin or K salts, bis(N-cyclohexyl)diazinium-(dioxy-copper or aluminum).

Preferably used as insecticides are:

phosphoric acid esters such as azinphos-ethyl, azinphos-methyl, 1-(4-chlorophenyl)-4-(O-ethyl, S-propyl)phosphoryloxypyrazole (TIA-230), chlorpyrifos, coumaphos, demeton, demeton-S-methyl, diazinone, dichlorfos, dimethoate, ethoprophos, etrimfos, fenitrothione, fention, heptenophos, parathione, parathione-methyl, phosalone, phoxim, pirimiphos-ethyl, pirimiphos-methyl, profenofos, prothiofos, sulprofos, triazophos and trichlorphon.

Carbamates such as aldicarb, bendiocarb, BPMC (2-(1-methylpropyl)phenylmethylcarbamate), butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, cloethocarb, isoprocarb, methomyl, oxamyl, pirimicarb, promecarb, propoxur and thiodicarb.

Pyrethroids such as allethrin, alphamethrin, bioresmethrin, byfenthrin (FMC 54800), cycloprothrin, cyfluothrin, decamethrione, cyhalothrin, cypermethrin, deltamethrin, alpha-cyano-3-phenyl-2-methylbenzyl-2,2-dimethyl-3-(2-chloro-2-trifluoromethylvinyl) cyclopropane carboxylate, fenpropathrin, fenfluthrin, fenvalerate, flucythrinate, flumethrin, fluvalinate, permethrin and resmethrin; nitroimino- and nitromethylene compounds such as 1-[(6-chloro-3-pyridinyl)methyl]-4,5-dihydro-N-nitro-1H-imidazol-2-amine (imidachlopride).

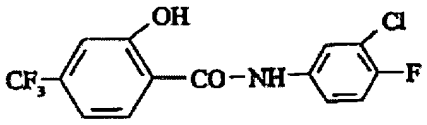
Organosilicon compounds, preferably dimethyl(phenyl)silylmethyl-3-phenoxybenzyl ethers such as dimethyl-(4-ethoxyphenyl)silylmethyl-3-phenoxybenzyl ethers or dimethyl(phenyl)silylmethyl-2-phenoxy-6-pyridylmethyl ether such as dimethyl-(9-ethoxyphenyl)silylmethyl-2-phenoxy-6-pyridylmethyl ether or (phenyl)[3-(3-phenoxyphenyl)propyl](dimethyl)silanes such as (4-ethoxyphenyl)-[3(4-fluoro-3-phenoxyphenyl)propyl]dimethylsilane.

Possibilities as other active agents are algicides, molluscicides, and active agents to combat "sea animals" that infest ship-bottom paints.

The preparation of the active agents and their use in accordance with the invention are illustrated by the following examples.

Preparation examples

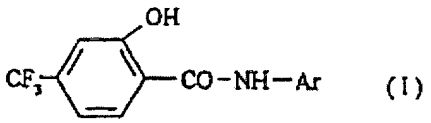
Example 1



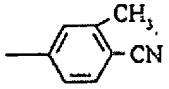
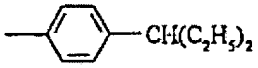
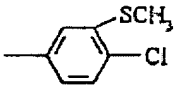
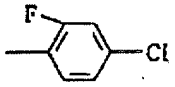
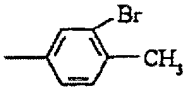
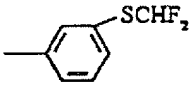
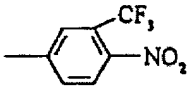
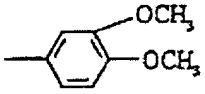
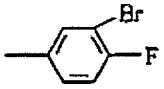
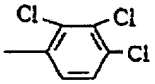
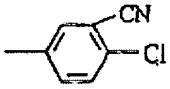
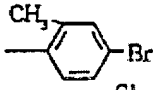
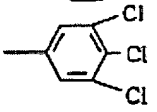
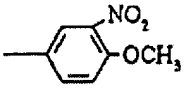
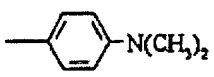
0.7 mL phosphorus trichloride is slowly added at the reflux temperature to 4.12 g (0.02 mol) 2-hydroxy-4-trifluoromethylbenzoic acid and 2.91 g (0.02 mol) 3-chloro-4-fluoroaniline in 100 mL toluene, and after the addition has been completed the mixture is stirred for another 16 h at reflux. The reaction mixture is concentrated and the product is crystallized from isopropanol/water. One obtains 4.56 g (68% of theory) 2-hydroxy-4-trifluoromethylbenzoic acid 3-chloro-4-fluoroanilide, with melting point 179°C.

The compounds of formula I listed in the following Table 1 are prepared analogous to Example 1 and in correspondence with the general description of the method in accordance with the invention.

Table 1



(I)

① Bsp.-Nr.	Ar	② Fp. (°C)
2		186
3		162
4		161
5		213
6		191
7		155
8		180
9		159
10		187
11		208
12		230
13		218
14		215
15		209
16		256 (③ Zers.)

Bsp.-Nr. ①	Ar	Fp. (°C) ②
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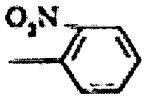
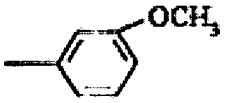
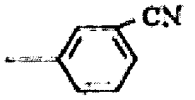
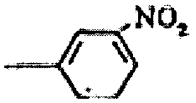
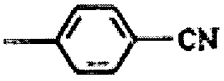
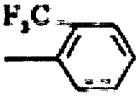
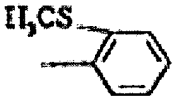
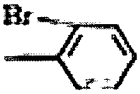
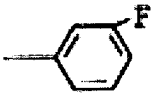
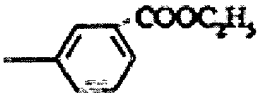
18		152
19		166
20		228 ③
21		255 (Zers.)
22		209
23		134
24		120
25		159
26		184
27		156
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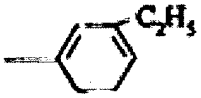
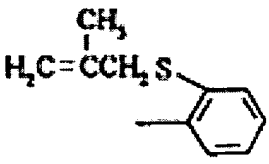
29		151
30		74

Bsp.-Nr. ①	Ar	Fp. (°C) ②
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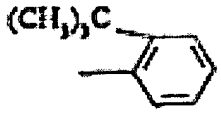
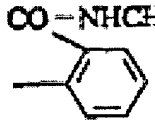
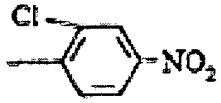
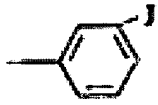
32		190
33		211
34		195
35		190
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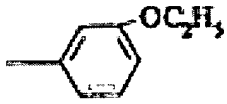
37		156
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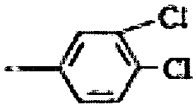
39		183
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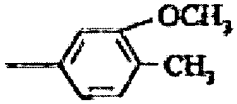
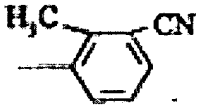
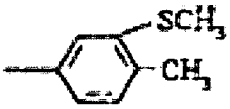
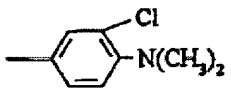
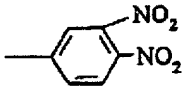
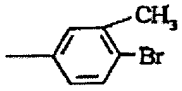
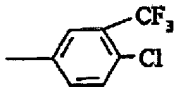
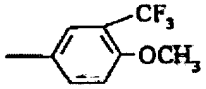
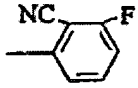
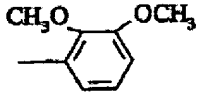
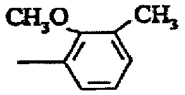
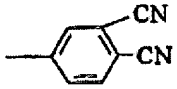
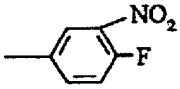
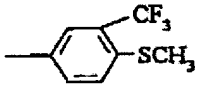
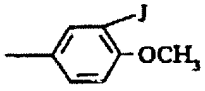
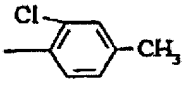
43		152
44		167
45		175

① Bsp.-Nr.	Ar	② Fp. (°C)
46		187
47		165-70
48		197
49		169
50		196
51		217
52		186
53		207
54		262
55		226
56		177
57		201
58		178

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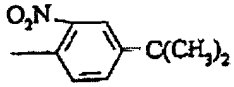
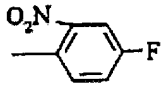
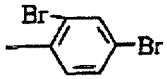
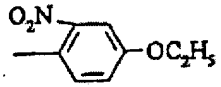
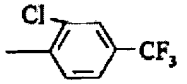
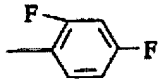
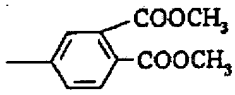
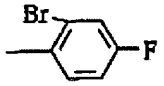
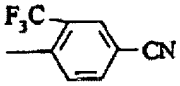
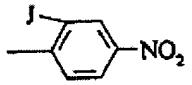
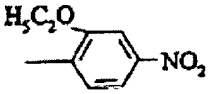
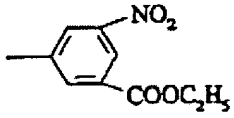
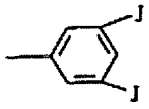
59		165
60		158
61		202
62		161
63		167
64		217
65		162
66		161
67		188
68		173
69		186
70		③ 230 (Zers.)
71		221

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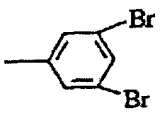
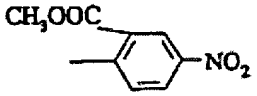
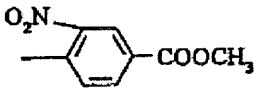
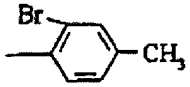
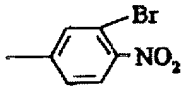
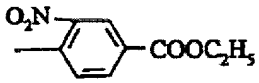
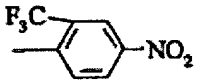
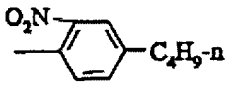
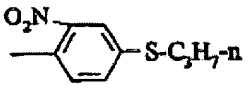
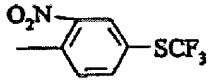
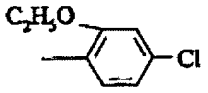
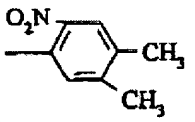
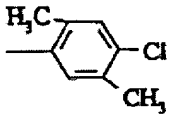
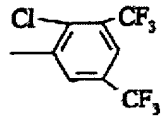
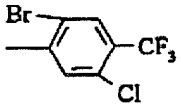
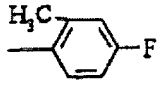
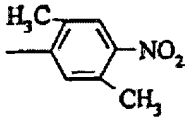
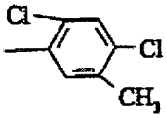
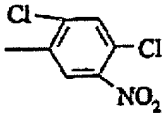
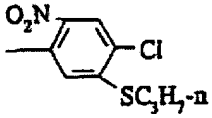
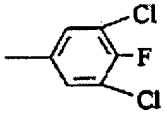
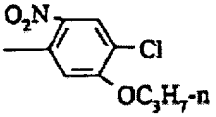
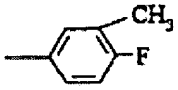
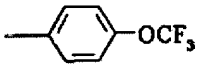
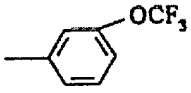
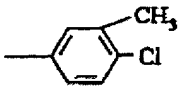
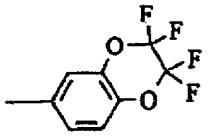
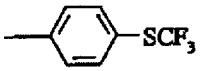
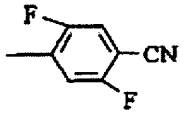
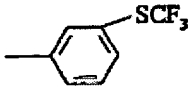
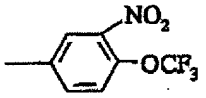
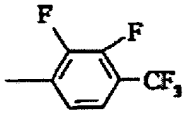
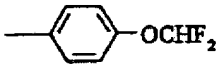
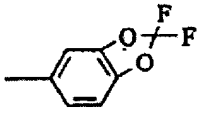
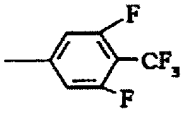
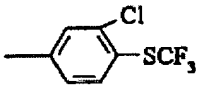
72		212
73		182
74		167
75		174
76		186
77		194
78		163
79		114
80		132
81		115
82		152
83		188
84		181

① Bsp.-Nr.	Ar	② Fp. (°C)
85		156
86		190
87		159
88		208
89		196
90		191
91		121
92		134-38
93		135
94		170
95		170
96		141

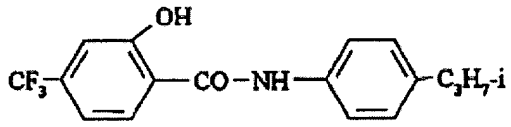
(1) Bsp.-Nr.	Ar	(2) Fp. (°C)
97		191
98		175
99		162
100		222
101		173
102		199
103		206
104		158
105		184
106		200
107		167

[Key to previous pages:]

1	Example No.
2	m.p.
3	(dec.)

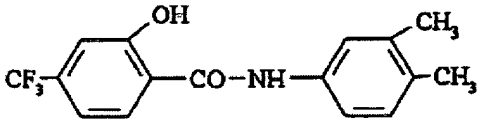
Application example

In the following application examples the listed compounds were used as comparison substances:



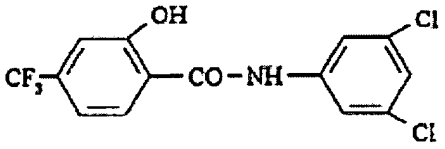
(A)

2-Hydroxy-4-trifluoromethyl-N-(4-isopropylphenyl) benzamide



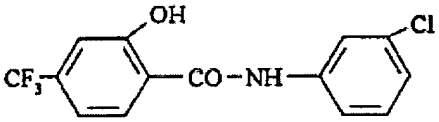
(B)

2-Hydroxy-4-trifluoromethyl-N-(3,4-dimethylphenyl) benzamide



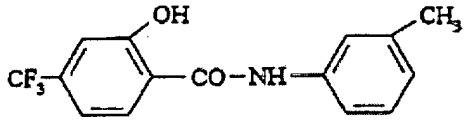
(C)

2-Hydroxy-4-trifluoromethyl-N-(3,5-dichlorophenyl) benzamide



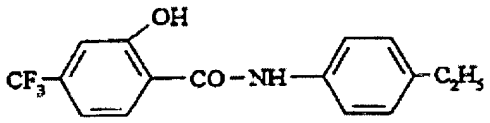
(D)

2-Hydroxy-4-trifluoromethyl-N-(3-chlorophenyl) benzamide



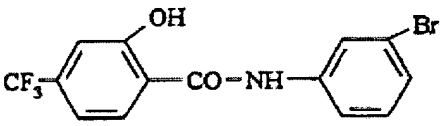
(E)

2-Hydroxy-4-trifluoromethyl-N-(3-methylphenyl) benzamide



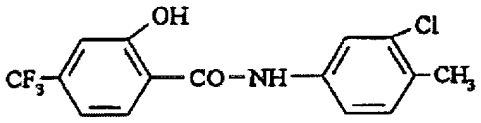
(F)

2-Hydroxy-4-trifluoromethyl-N-(4-ethylphenyl) benzamide



(G)

2-Hydroxy-4-trifluoromethyl-N-(3-bromophenyl) benzamide



(H)

2-Hydroxy-4-trifluoromethyl-N-(3-chloro-4-methylphenyl)benzamide
(All known from WO-A 92/17066)

Example A

Phytophthora test (tomato)/protective

Solvent: 4.7 parts by weight acetone

Emulsifier: 0.3 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amounts of solvent and emulsifier and the concentrate is diluted with water to the desired concentration.

To test the protective effectiveness, young plants are sprayed with the active agent preparation until dripping wet. After the sprayed material has dried, the plants are immediately inoculated with an aqueous spore suspension of *Phytophthora.*

The plants are put into an incubation box at about 20°C with 100% relative air humidity.

The evaluation takes place 3 days after inoculation.

In this test, the compounds of Examples 1, 2, 5, 6, 7, 12, 13, 14, 15, 17, 19, 20, 21, 22, 25, 26, 27, 28, 29, 34, 38, 39, 41, 42, 48, 64, 66, 87, 94, 96, 97, 104 and 105 show an effectiveness of 70-100% at an active agent concentration of 10 ppm, while the comparison substance (C) has an effectiveness of 15%.

Example B

Plasmopara test (grapevine)/protective

Solvent: 4.7 parts by weight acetone

Emulsifier: 0.3 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amounts of solvent and emulsifier and the concentrate is diluted with water to the desired concentration.

To test the protective effectiveness, young plants are sprayed with the active agent preparation until dripping wet. After the sprayed material has dried, the plants are inoculated with an aqueous spore suspension of *Plasmopara viticola* and then left for 1 day in a humidity chamber at 20-22°C and 100% relative air humidity. Then the plants are set for 5 days in a greenhouse at 21°C and 90% air humidity. The plants are then moistened and put into a humidity chamber for 1 day.

The evaluation takes place 6 days after inoculation.

In this test, the compounds of Examples 1, 5, 6, 7, 11, 12, 13, 15, 17, 19, 20, 22, 25, 26, 27, 28, 29, 30, 37, 39, 42, 48, 49, 63, 75, 87, 88, 89, 90, 92, 94, 95, 96, 97, 98, 100, 101, 103, 104, 105, 106 and 107 show an effectiveness of 79-100% at an active agent concentration of 10 ppm.

Example C

Pyricularia test (rice)/protective

Solvent: 12.5 parts by weight acetone

Emulsifier: 0.3 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amounts of solvent and the concentrate is diluted with water and the given amount of emulsifier to the desired concentration.

To test for protective effectiveness, young rice plants are sprayed with the active agent preparation until dripping wet. After the sprayed material has dried, the plants are inoculated with an aqueous spore suspension of *Pyricularia oryzae*. Then the plants are put into a greenhouse at 100% relative air humidity and 25°C.

The infestation is evaluated 4 days after inoculation.

In this test, the compounds of Examples 1, 4, 5, 7, 8, 11, 12, 13, 14, 18, 20, 22, 26, 34, 63, 99, 100, 104, 105 and 106 show an effectiveness of 80-100% at an active agent concentration of 0.025 ppm.

Example D

Plutella test

Solvent: 31 parts by weight acetone

Emulsifier: 1 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amount of solvent and the given amount of emulsifier and the concentrate is diluted with emulsifier-containing water to the desired concentrations.

Cabbage leaves (*Brassica oleracea*) are treated with the active agent preparation of the desired concentration. A treated leaf is put into a plastic box and infested with larvae (L2) of the diamondback moth (*Plutella xylostella*). After 3 days an untreated leaf is used in each case for further food.

After the desired time, the eradication in % is determined. Here, 100% means that all of the animals were killed; 0% means that no animals were killed.

In this test, the compounds of Examples 47 and 48 show a degree of eradication of 100% after 7 days at an active agent concentration of 0.01%, while the comparison substances (A), (B), (C), (E) and (F) do not have any effect.

Example E

Tatranychus test (OP–resistant/immersion treatment)

Solvent: 7 parts by weight acetone

Emulsifier: 1 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amount of solvent and the given amount of emulsifier and the concentrate is diluted with emulsifier-containing water to the desired concentrations.

Bean plants (*Phaseolus vulgaris*), highly infested by all stages of the common spider mite *Tetranychus urticae*, are immersed in an active agent preparation of the desired concentration.

After the desired time, the effect in % is determined. Here, 100% means that all of the spider mites were killed; 0% means that no spider mites were killed.

In this test, the compounds of Examples 78, 98 and 103 show an eradication of 80-100% after 7 days at an active agent concentration of 0.01%, while the comparison substances (A), (B), (E) and (F) do not show any effect.

Example F

Phaedon larvae test

Solvent: 7 parts by weight dimethylformamide

Emulsifier: 1 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amount of solvent and the given amount of emulsifier and the concentrate is diluted with water to the desired concentrations.

Cabbage leaves (*Brassica oleracea*) are treated by immersion in the active agent preparation of the desired concentration and then infested with mustard leaf beetle larvae (*Phaedon cochleariae*) while the leaves are still wet.

After the desired time, the eradication is determined in %. Here, 100% means that all of the beetle larvae were killed; 0% means that no beetle larvae were killed.

In this test, the compounds of Examples 34, 63 and 68 show a 100% eradication after 7 days at an active agent concentration of 0.1%, while the comparison substance (B) does not exhibit any effect.

Example G

Plutella test

Solvent: 7 parts by weight dimethylformamide

Emulsifier: 1 part by weight alkylaryl polyglycol ether

To prepare an expedient active agent preparation, 1 part by weight active agent is mixed with the given amount of solvent and the given amount of emulsifier and the concentrate is diluted with water to the desired concentrations.

Cabbage leaves (*Brassica oleracea*) are treated by immersion in the active agent preparation of the desired concentration and populated with diamondback moth caterpillars (*Plutella maculipennis*) while the leaves are still wet.

After the desired time, the eradication is determined in %. Here, 100% means that all of the worms were killed; 0% means that no worms were killed.

In this test, the compounds of Examples 14, 20 and 63 show an eradication of 85-100% after 7 days at an active agent concentration of 0.1%, while the comparison substance (B) does not have any effect.

Example H

Material protection test

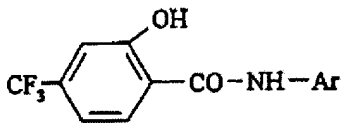
Inhibition test on giant colonies of Basidiomycetes

Mycelle pieces were cut out of colonies of *Gloeophyllum trabeum, Coniophora puteana, Poria placenta, Lentinus tigrinus, Coriolus versicolor* and *Stereum sanguinolentum* and incubated on a malt extract peptone-containing agar nutrient bed at 26°C. The inhibition of the hypha growth on the active agent–containing nutrient bed was compared with the lengthwise growth on a nutrient bed without active agent additive and rated at a percent of inhibition.

In this test, the compounds of Examples 1, 3, 17, 34, 38 and 92 in accordance with the invention show a growth inhibition of 50-100% at an active agent concentration of 20 ppm.

Claims

1. 4-Trifluoromethylbenzamides of formula (I)



(I)

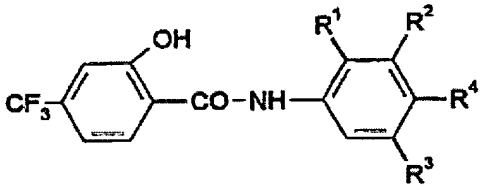
in which

Ar stands for substituted phenyl,

with the exception of:

3-chlorophenyl; 3-bromophenyl; 3-methylphenyl; 3-trifluoromethylphenyl; 4-chlorophenyl; 4-methoxyphenyl; 4-trifluoromethylphenyl; 4-(C_1-C_3)alkylphenyl; 3,5-dichlorophenyl; 3-chloro-4-methylphenyl and 3,4-dimethylphenyl.

2. Compounds of formula (III)



(III)

in which

R^1, R^2, R^3, and R^4, independent of one another, stand for hydrogen, halogen, cyano, nitro; straight-chain or branched alkyl, alkoxy or alkylthio with 1-6 carbon atoms each; straight-chain or branched haloalkyl, haloalkoxy or haloalkylthio with 1-4 carbon atoms each, and 1-9 like or different halogen atoms;

straight-chain or branched alkoxycarbonyl or alkoximinoalkyl with 1-4 carbon atoms each in the individual alkyl parts; amino, aminocarbonyl; straight-chain or branched alkylamino, alkylaminocarbonyl, dialkylamino or dialkylaminocarbonyl with 1-4 carbon atoms each in the individual alkyl parts; straight-chain or branched alkenyl, alkenyloxy or alkenylthio with 2-4 carbon atoms each; and phenyl optionally substituted one to three times, in the same way or differently, by halogen and/or straight-chain or branched alkyl with 1-4 carbon atoms, where at least one of the residues R^1, R^2 R^3 and R^4 does not stand for hydrogen, and with the exception of:

3-chlorophenyl; 3-bromophenyl; 3-methylphenyl; 3-trifluoromethylphenyl; 4-chlorophenyl; 4-methoxyphenyl; 4-trifluoromethylphenyl; 4-(C_1-C_3) alkylphenyl; 3,5-dichlorophenyl; 3-chloro-4-methylphenyl and 3,4-dimethylphenyl.

3. Compounds of formula (III) In accordance with Claim 2,

in which

R^1, R^2, R^3 and R^4, independent of one another, stand for hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl; amino, aminocarbonyl, methylamino, ethylamino, n- or isopropylamino, methylaminocarbonyl, ethylaminocarbonyl, n- or isopropylaminocarbonyl, dimethylamino, ethylmethylamino, methyl-n-propylamino, methylisopropylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, ethylmethylaminocarbonyl, methyl-n-propylaminocarbonyl, methylisopropylaminocarbonyl, diethylaminocarbonyl, propenyl, butenyl, isobutenyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio, isobutenylthio;

or phenyl optionally substituted one to three times, in the same way or differently, by fluorine, chlorine, bromine, methyl and/or ethyl, where at least one of the residues R^1, R^2, R^3 and R^4 does not stand for hydrogen, and except for:

3-chlorophenyl; 3-bromophenyl; 3-methylphenyl; 3-trifluoromethylphenyl; 4-chlorophenyl; 4-methoxyphenyl; 4-trifluoromethylphenyl; 4-(C_1-C_3) alkylphenyl; 3,5-dichlorophenyl; 3-chloro-4-methylphenyl and 3,4-dimethylphenyl.

4. Compounds of formula (III) In accordance with Claim 2,

in which

R^1, R^2, R^3 and R^4, independent of one another, stand for hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, methyl, ethyl, n- or isopropyl; n-, iso-, sec- or tert-butyl; n-, iso-, sec- or tert-pentyl; methoxy, ethoxy, n- or isopropoxy; n-, iso-, sec- or tert-butoxy; methylthio, ethylthio, n- or isopropylthio; n-, iso-, sec- or tert-butylthio; trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, methoxycarbonyl, ethoxycarbonyl; methylamino, ethylamino, methylaminocarbonyl, ethylaminocarbonyl, dimethylamino, ethylmethylamino, diethylamino, dimethylaminocarbonyl, ethylmethylaminocarbonyl, diethylaminocarbonyl, propenyloxy, butenyloxy, isobutenyloxy, propenylthio, butenylthio or isobutenylthio, where at least one of the residues R^1, R^2, R^3 and R^4 does not stand for hydrogen, and except for:

3-chlorophenyl; 3-bromophenyl; 3-methylphenyl; 3-trifluoromethylphenyl; 4-chlorophenyl; 4-methoxyphenyl; 4-trifluoromethylphenyl; 4-(C_1-C_3) alkylphenyl; 3,5-dichlorophenyl; 3-chloro-4-methylphenyl and 3,4-dimethylphenyl.

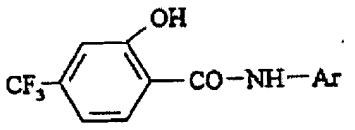
5. Pesticides characterized by a content of at least one compound of formula (I) In accordance with Claim 1.

6. A method for combatting pests, which is characterized by the fact that pests and/or their living space are acted upon by compounds of formula (I) In accordance with Claim 1.

7. The use of compounds of formulas (I) or (III) In accordance with Claims 1-4 to combat pests.

8. A method for preparation of pesticides, which is characterized by the fact that compounds of formulas (I) or (III) In accordance with Claims 1-4 are mixed with extenders and/or surface-active agents.

9. A method for preparation of 4-trifluoromethylbenzamides of formula (I),

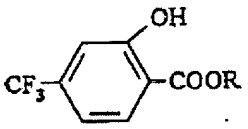


(I)

in which

Ar has the meaning given in Claim 1,

which is characterized by the fact that 2-hydroxy-4-trifluoromethylbenzoic acid or its esters of formula (II)



(II)

in which

R stands for hydrogen or alkyl,

are reacted with anilines of the formula (III),

H_2N - Ar (III)

in which

Ar has the meaning given above,

in the presence of a condensation agent and optionally in the presence of a diluent and a reaction aid.